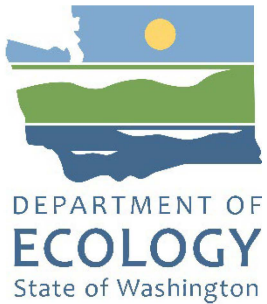




# WELCOME TO LET'S TALK ABOUT HANFORD

WE WILL BEGIN TONIGHT'S  
CONVERSATION SOON





# Let's talk about Hanford

242-A Evaporator and LERF/ETF





# 242-A Evaporator

Andrew Pomiak

242-A Evaporator Environmental Permit Lead





# 242-A Evaporator

- Constructed in 1974 and began operations in 1977.
- Integral to the management of tank waste. As waste from tanks are blended, treated, transferred, and retrieved, the 242-A Evaporator helps manage tank waste volume.
- Treats tank waste via a conventional forced-circulation, vacuum evaporation system.
- Permitted to store and treat mixed waste; accomplished in tank systems.



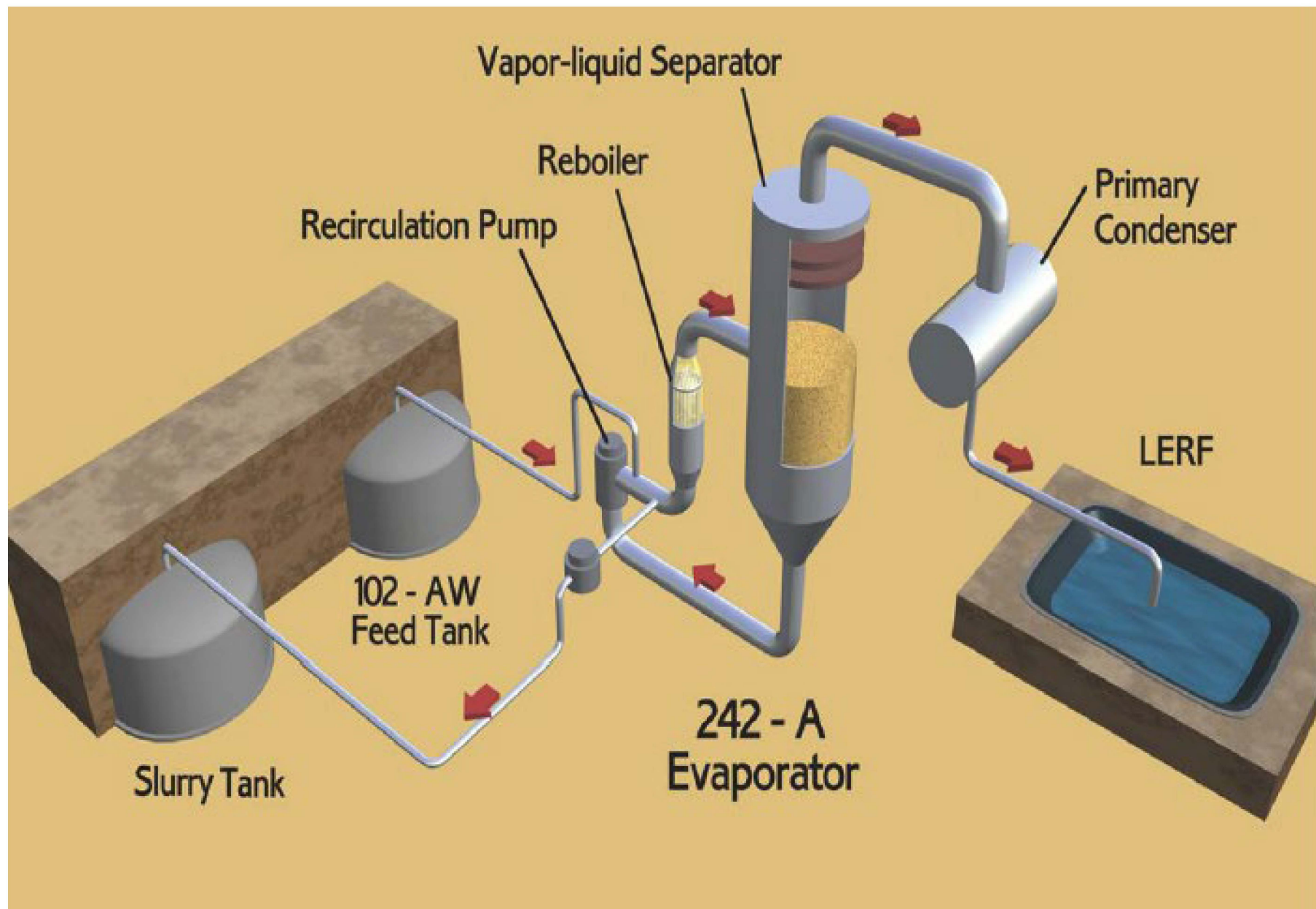


# 242-A Evaporator

Waste is staged in Double Shell Tank (DST) 241-AW-102.

Operations generate two dangerous waste streams:

- Concentrated slurry.
  - Sent back to DST system to a designated receiver tank.
- Process condensate.
  - Transferred to Liquid Effluent Retention System (LERF) for further treatment.
- Waste is heated to ~125 °F in the Reboiler, discharged to the Vapor-liquid Separator which is under a vacuum to reduce the boiling point.
- Overheads are condensed in three condensers, stored in a storage tank, and transferred to LERF.



# 242-A Evaporator

- Generates other non-dangerous wastes, including:
  - Steam condensate.
    - Steam used to heat the waste in the Reboiler.
  - Used raw water.
    - Used in condensers as cooling water.
- Treatment occurs in batches, as campaigns. Waste is staged bench-scale tested in 222-S laboratory to determine the specific goals of the campaign.
- Once a concentration is reached during treatment, the slurry is returned to the DST system, and the system is flushed and prepared for the next campaign.



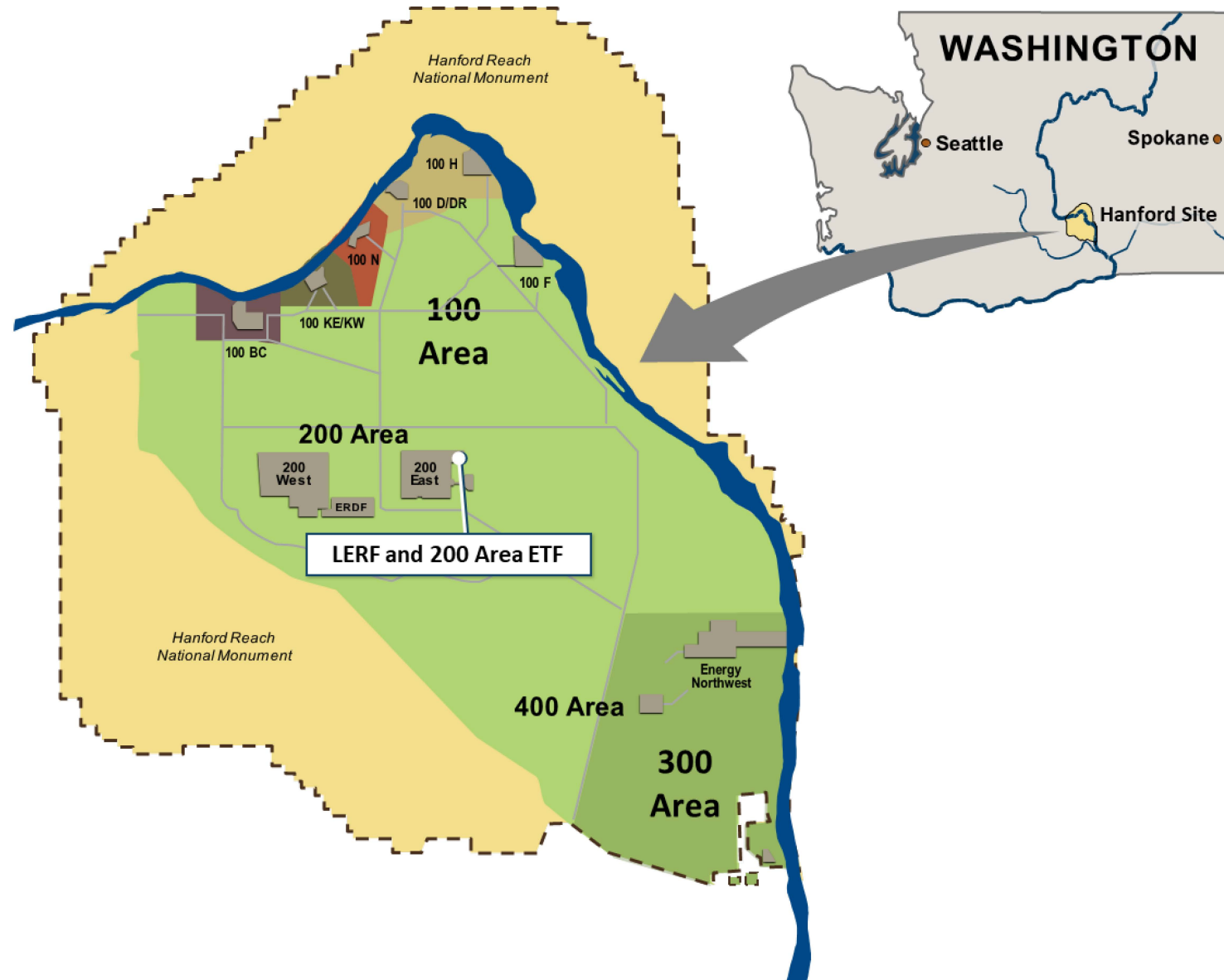


# Liquid Effluent Retention Facility (LERF) and 200 Area Effluent Treatment Facility (ETF)

Edward Holbrook  
Waste Management Section Manager

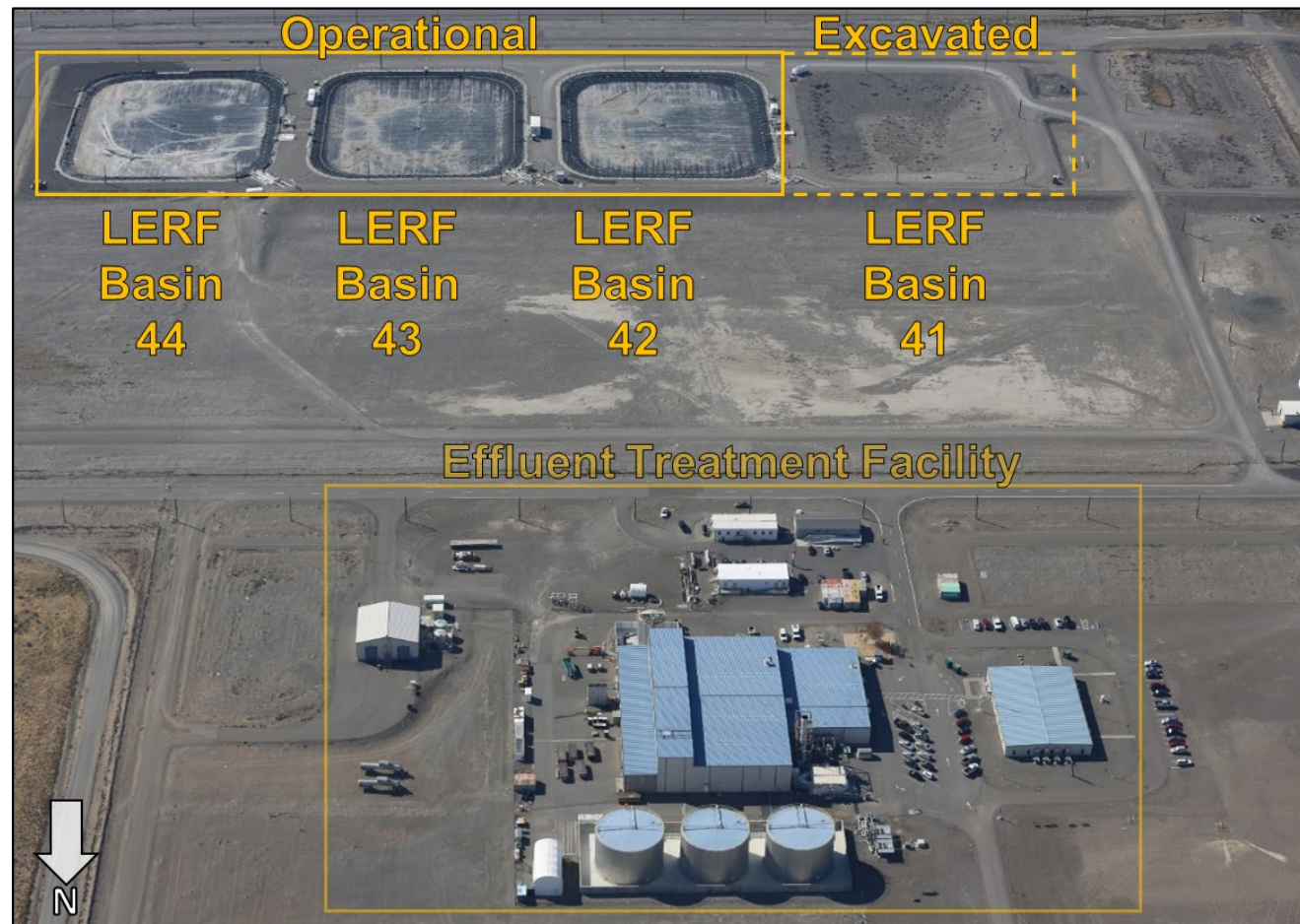


# Hanford Site Map



# LERF/ETF

- These facilities work to store, treat, and dispose of large volumes of liquid waste.
- Liquid Effluent Retention Facility (LERF) – a series of retention basins designed to store liquid waste until it can be processed at the ETF.
- Effluent Treatment Facility (ETF) – processes liquid waste to remove chemical and radioactive contaminants





# LERF/ETF

- Many of the aqueous wastes generated from site remediation and waste management activities are sent to the LERF and 200 Area ETF for treatment and storage.
- Aqueous wastes that are acceptable for treatment and/or storage at the LERF and 200 Area ETF include, but are not limited to the following Hanford wastes:
  - Aqueous waste from 242-A Evaporator, Waste Treatment and Immobilization Plant (WTP) and the analytical laboratory
  - Contaminated groundwater from pump-and-treat remediation activities
  - Purgewater from groundwater monitoring activities
  - Water from deactivation activities, such as water from the spent fuel storage basins at deactivated reactors (e.g., N Reactor).
  - Laboratory aqueous waste from unused samples and sample analyses
  - Leachates from landfills, such as the Low Level Burial Grounds Trenches 31 and 34, and the Integrated Disposal Facility (IDF).
  - 200 Area ETF remains a backup treatment capability for the ERDF leachate.
  - Any dilute waste, which may be accepted for treatment and within the scope of wastewaters

# LERF

- There are 4 permitted LERF basins: Basin 41, 42, 43, and 44
- Basin 41 (4<sup>th</sup> basin) is under construction now.
- Storage capacity of each basin is 7.8 million gallons
- The LERF can receive aqueous waste through five inlets:
  - (1) Transfer line from 200 West Area
  - (2) Transfer line from 242-A Evaporator
  - (3) Transfer line from the ETF Load-In Station
  - (4) Inter-basin sample ports connection
  - (5) Transfer line from Waste Treatment and Immobilization Plant (WTP)



# 200 Area ETF

- 200 Area ETF is designed to treat the contaminants anticipated in process condensate from the 242-A Evaporator, WTP-EMF (Effluent Management Facility), and other aqueous wastes from the Hanford Site.
- 200 Area ETF consists of primary and secondary treatment trains.
- The primary treatment train removes or destroys dangerous and mixed waste components from the aqueous waste
- In the secondary treatment train, the waste components are concentrated and either dried into a powder or managed as brine from the concentrate tanks.



*Figure 2 200 Area ETF buildings- Photo courtesy DOE*



# 200 Area ETF primary treatment

LERF and 200 Area ETF

- The primary treatment train includes the following (blue):

- Surge tank
- Filtration
- Ultraviolet light oxidation (UV/OX)
- pH adjustment
- Hydrogen peroxide decomposition
- Degasification
- Reverse osmosis (RO)
- Ion exchange
- Steam stripping
- Verification

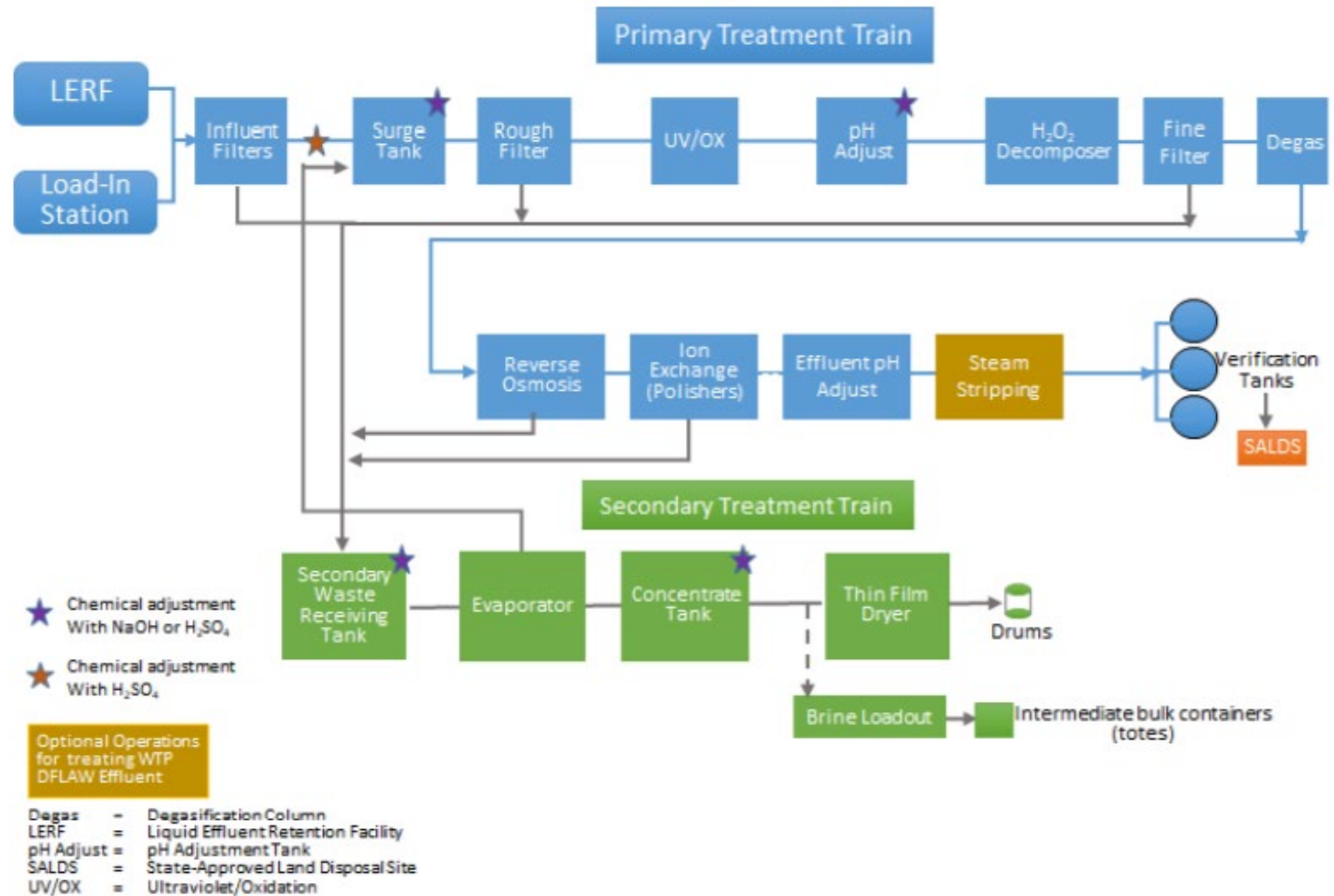


Figure C-4 Example – 200 Area Effluent Treatment Facility Configuration 1

# 200 Area ETF secondary treatment

LERF and 200 Area ETF

- The secondary treatment train includes the following (green):
  - Secondary waste receiving
  - Evaporation (with mechanical vapor recompression)
  - Concentrate (brine) staging
  - Thin film drying
  - Brine load out
  - Container handling
  - Supporting systems

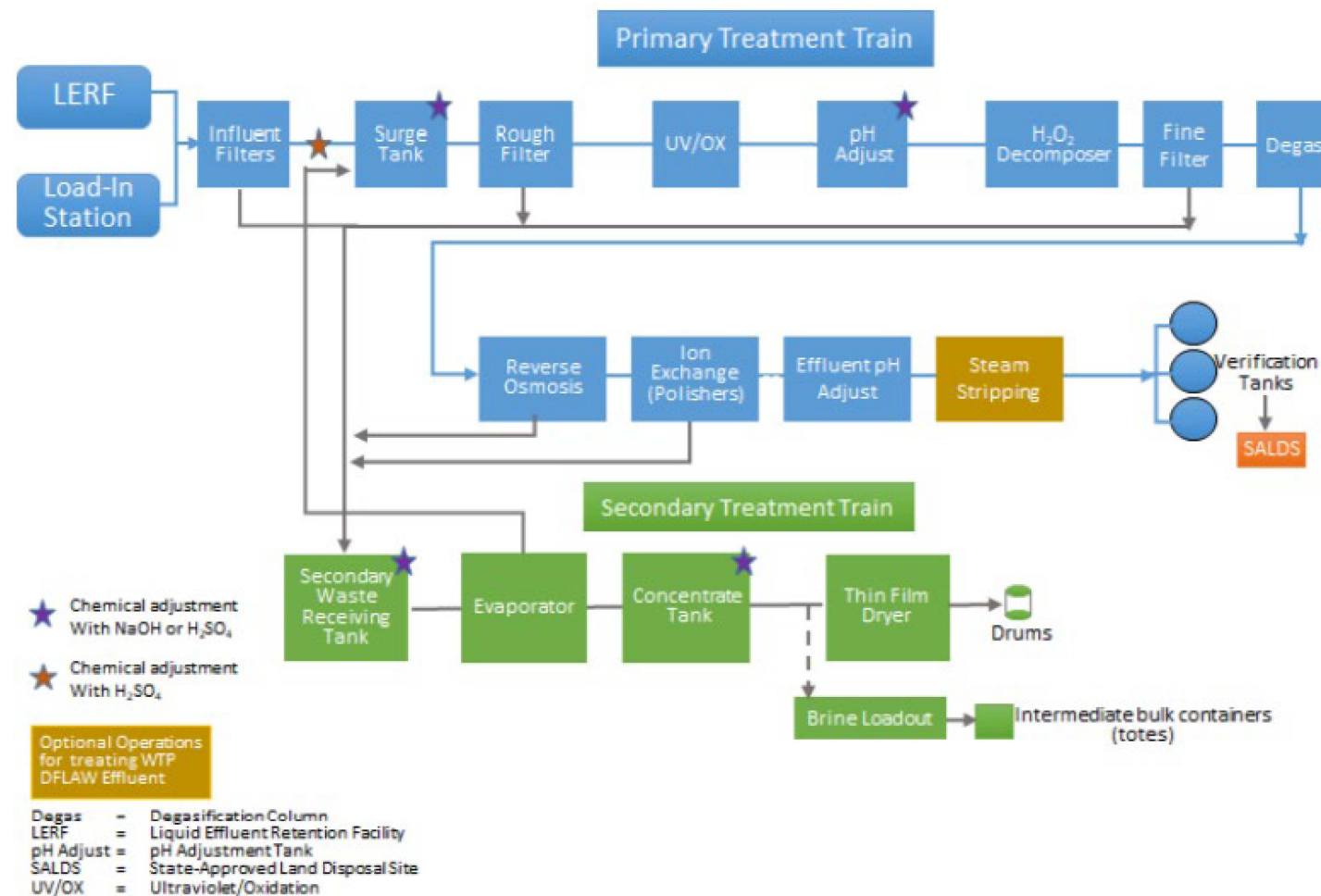
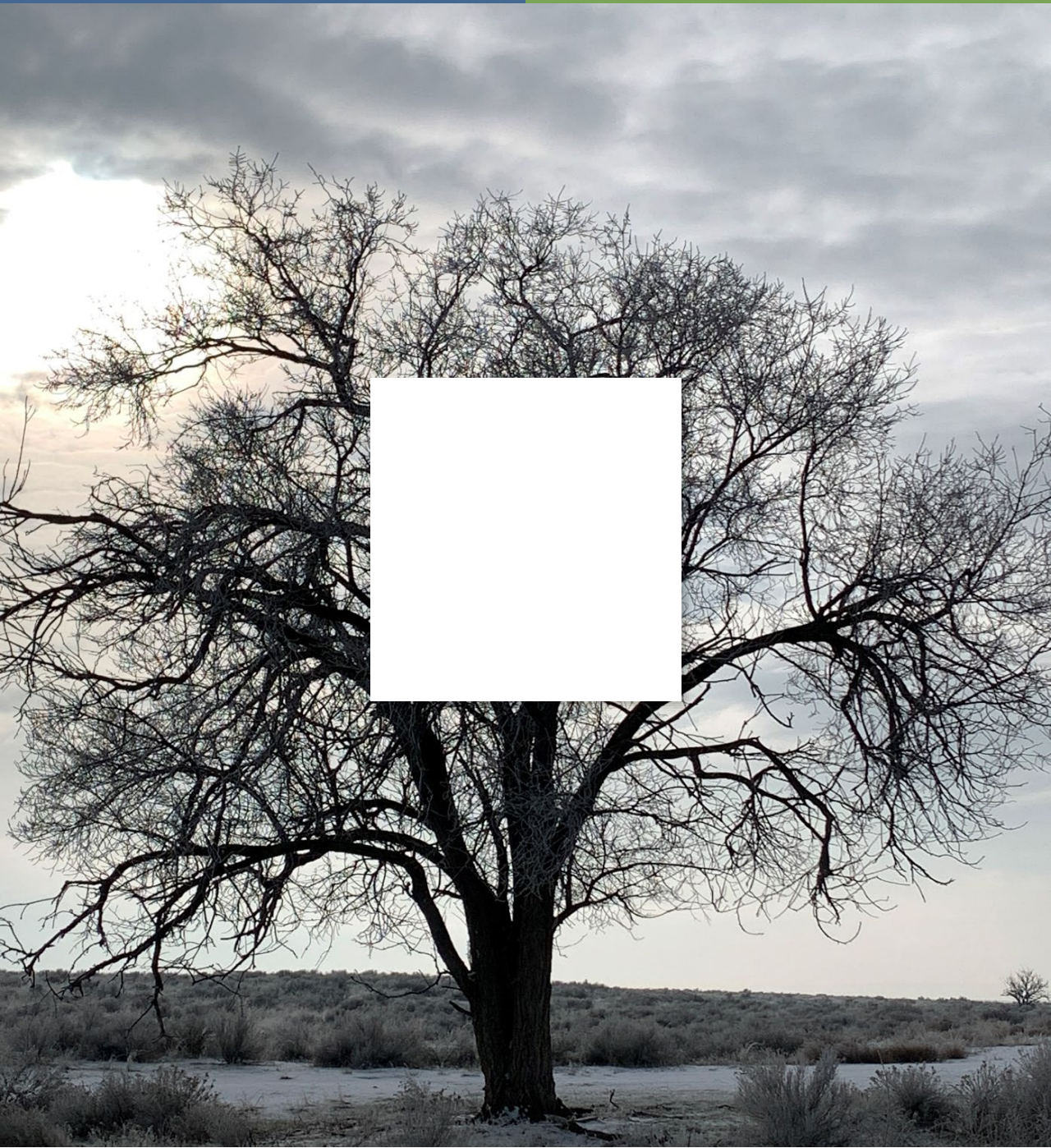


Figure C-4 Example – 200 Area Effluent Treatment Facility Configuration 1

# LERF/ETF

- The treated effluent from the primary treatment train is contained in verification tanks where the effluent is sampled to confirm that it meets the Delisting criteria. The treated effluent is no longer a listed dangerous waste.
- The treated effluent is discharged under the Discharge Permit Number ST0004500 as a non-dangerous, delisted waste to the SALDS, located in the 600 Area, north of the 200 West Area.
- A portion of the treated wastewater from the Verification Tanks is recycled as service water throughout the facility
- The secondary waste is containerized, and transferred to an authorized dangerous waste facility, or the Environmental Restoration Disposal Facility (ERDF).





## Learn more



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